LYUBIMOV, S. M.

Foundations

Calculation of the vibration of foundations under hammers. Stroi. prom., 30, No. 2, 1952.

Monthly List of Russian Accessions, Library of Congress, March 1952. Unclassified.

LYUBIMOV, S.M., inzhener.

Calculation and planning of foundations for large hammers. Stroi.prom. vol. 31 no.9:23-26 S '53. (MLRA 6:9)
(Hammers) (Foundations)

LYUBIMOV, S.M., arkhitektor (g. Ordzhonikidze)

Reader's remarks. Gor.khoz.Mosk. 32 no.12:39 D '58. (MIRA 11:12)
(Moscow--Gutters) (Moscow--Landscape gardening)
(Dampness in buildings)

LYUBIMOV, S.M. (g.Ordzhonikidze)

Calculating the strength of foundations of circular rigid footings.
Osn.fund.i mekh.grun. 2 no.2:25-26 '60. (MIRA 13:8)
(Foundations)

LYUBIMOV, Sergey Petrovich; TSAREV, Vasiliy Alekseyevich; CHERNICHENKO, Yuriy Dmitriyevich; MIRONOV, T.V., red.; MATVEYEV, A.P., tekhn. red.

[Resources of virgin lands are for the people] Bogatstva tseliny - narodu. Moskva, Izd-vo "Sovetskaia Rossiia," 1960. 101 p. (MIRA 14:7)

(Reclamation of land) (Agriculture)

OGOLEV, N.P.; ISAYEV, K.M.; NIKHALYAK, Ya.S., kand. yurid. nauk;
VOLKOV, M.I., kand. ekon. nauk; KOROTKOV, V.S.;
LYUBIMOV, S.P., red.; KOROBOVA, N.D., tekhn. red.

[Trade-union group organizer's companion] Sputnik profgruporga...
[By] N.P.Ogolev i dr. Moskva, Profizdat, 1962. 288 p.
(MIRA 16:10)

(Trade unions--Handbooks, manuals, etc.)

L 56492-65
ACCESSION NR: AP5017800

UR/0286/65/000/011/0031/0031
631.859.12.002.2

AUTHOR: Karatayev, I. I.; Mel'nik, B. D.; Repenkova, T. G.; Sviridova, A. G.; Doktorov, N. I.; Nazarov, G. N. Raygorodskiy, I. M.; Vasil'yev, B. T.; Bystrov, M. V.; Babaryka, I. F.; Kuzyak, F. A.; Fel'dman, M. V.; Soverchenko, D. A.; Buslakova, L. P.; Toroptseva, N. P.; Lyubimov, S. V.; Ul'yanov, A. T.; Andres, V. V.; Sobchuk, Yu. I.; Tsetlina, M. M.; Andreyev, V. V.; Kramer, G. L.

TITLE: A method for producing phosphoro-potassium fertilizers. Class 16, No. 171-409

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 11, 1965, 31

TOPIC TAGS: fertilizer, phosphate, potassium

ABSTRACT: This Author's Certificate introduces a method for producing phosphoro-potassium fertilizers using cement dust (waste from cement production) as the potassium raw material. The process of adding potassium to the product is simplified and evaporation is prevented by using a 20% excess of an acid which directly neutralizes the cement dust for breaking down the phosphate raw material.

Card 1/2

L 56492-65

ACCESSION NR: AP5017800

ASSOCIATION: none

SUBMITTED: 29Mar62 ENCL: 00 SUB CODE: GC, LS

NO REF SOV: 000 OTHER: 000

Card 2/2

LYUBIMOV, Semen Yevseyevich; KASHIRSKIY, F., redaktor; DANILINA, A., tekhnicheskiy redaktor

[For the industrialization of construction] Za industrializatsiiu stroitel'stva. Moskva, Gos. izd-vo polit. lit-ry, 1956. 60 p. (Construction industry) (MLRA 9:9)

LYUBIMOV, Semen Yevseyevich,; ALPATOV, G.; DUKEL'SKIY, G.;RAZUMKOV, P.,red.; YAKOVLEVA, Ye., tekhn. red.

[Moscow builds] Moskva stroitsia. [Moskva] Mosk. rabochii, 1958. 157 p. (MIRA 11:12)

(Moscow--Description)

LYUBIMOV, V., starshiy inzh.-leytenant

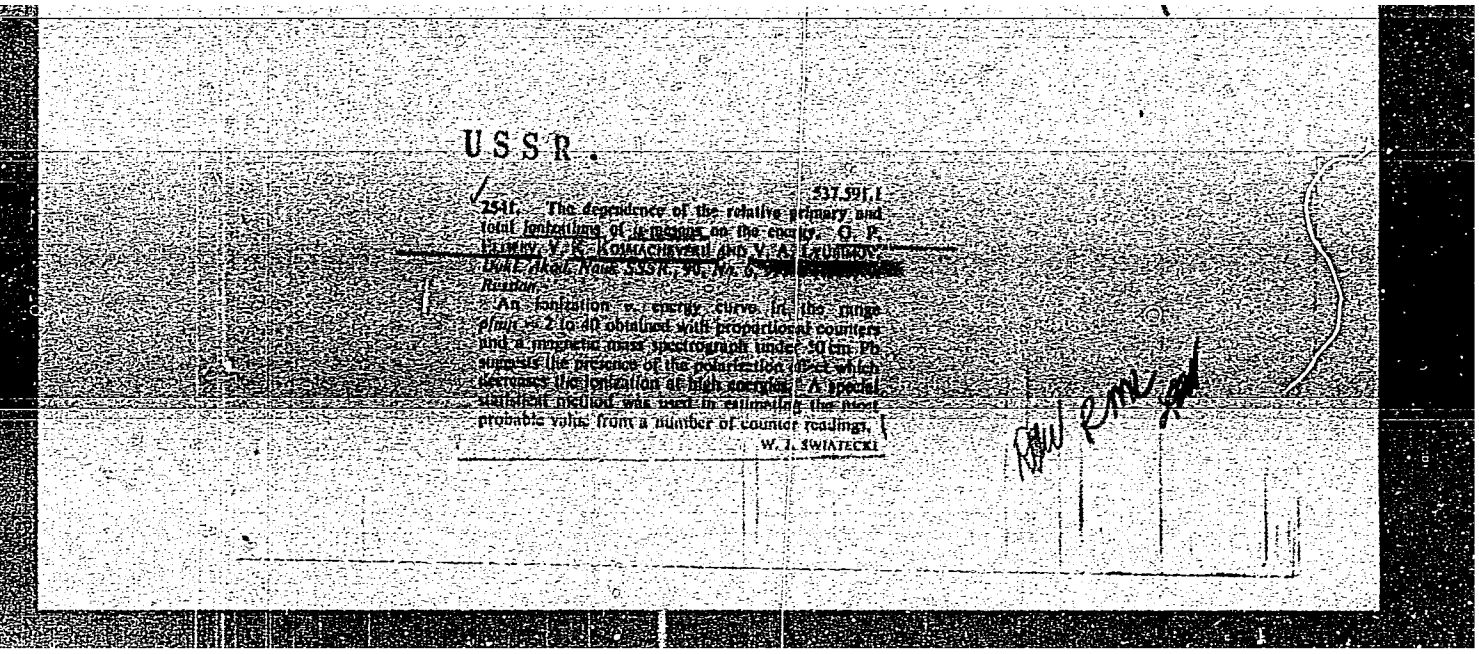
Servicing automatic antiaircraft guns. Voen.vest. 39 no.4:69-71 Ap '60. (MIRA 14:2)

(Antiaircraft guns)

LYUBIMOV, V.A., mladshiy nauchnyy sotrudnik

Universal UP-1 tying-in machine. Tekst. prom. 20 no. 11:35-37 N '60. (MIRA 13:12)

1. TSentral'nyy nauchno-issledovatel'skiy institut sherstyanoy promyshlennosti.
(Textile machinery) (Woolen and worsted manufacture)



USSR.

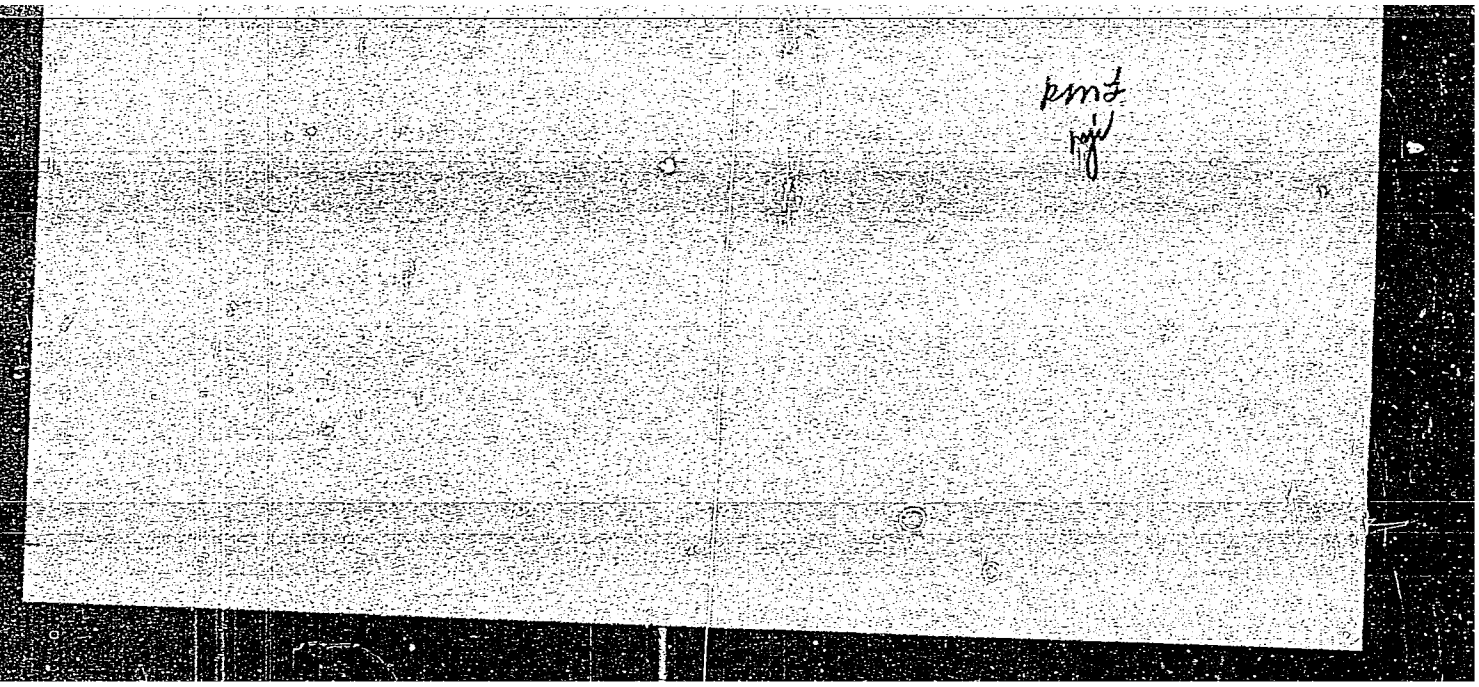
537.591.1

2541. The dependence of the relative primary and total ionization of α-mesons on the energy. O. F. NEMETS, V. K. KOMACHKEVICH and V. A. LYUBIMOV. *Doklady Akad. Nauk SSSR*, 90, No. 6, [illegible] Russian.

An ionization v. energy curve, in the range $\beta\gamma = 2$ to 40 obtained with proportional counters and a magnetic mass spectrograph under 50 cm. Pb suggests the presence of the polarization effect which increases the ionization at high energies. A special statistical method was used in estimating the most probable value from a number of counter readings.

W. J. ŚWIĄTECKI

Investigation with a mass spectrometer of the cosmic radiation at sea level by measuring the momentum and the ionizing effect of individual particles. V. A. Lyubimov, G. P. Eliseev, and V. K. Kosmachevskii. *Bull. Acad. Sci. U.S.S.R., Phys. Ser.* 6, 652–62(1955)(English translation). —See *C.A.* 50, 7618a.



LYUBIMOV, V.A.; YELISEYEV, G.P.; KOSMACHEVSKIY, V.K.

Investigation of cosmic rays at sea level with the aid of the mass-spectro-meter by measuring the impulse and ioninizing capacity of individual particles. Izv.AN SSSR.Ser.fiz.19 no.6:720-731 N-D '55. (MLRA 9:4)

1.Akademiya nauk SSSR.

(Cosmic rays) (Nuclear physics)

LYUBIMOV, V.A.; YELISEYEV, G.P.; KOSMACHEVSKIY, V.K.; KOVDA, A.V.

Pulse dependence of the probability of ionization induced by μ-mesons. Izv. AN SSSR.Ser.fiz.19 no.6:753-757 N-D '55. (MLRA 9:4)

1.Akademiya nauk SSSR.

(Cosmic rays) (Nuclear physics)

LYUBIMOV, V.A.

Probable ionization of μ mesons in a gas in the impulse range $2 \times 10^{9} - 1.2 \times 10^{12}$ e.v./c. V. A. Lyubimov, G. P. Eliseev, V. K. Kosmat, ~ukil, and A. V. Kovda. *Doklady Akad. Nauk S.S.S.R.* 100, 883-6(1955).—The spectrum for the probable ionization of μ mesons in a gas was measured and the exptl. data were compared quantitatively with the theoretical curves. The ionization capacity increased logarithmically with velocity for the impulse range $4 \times 10^{8} - 2 \times 10^{10}$ e.v./c. For impulses $> 3 \times 10^{10}$ e.v./c. the probable ionization was indepetident of the impulse. J. Rovtar Leach

(3)

LYUBIMOV, V. A.

USSR/ Physics - Cosmic radiation

Card 1/1 Pub. 22 - 14/49

Authors : Lyubimov, V. A.; Eliseev, G. P.; and Kosmachevskiy, V. K.

Title : Measuring the masses by impulse and ionization and the spectra of the impulses of various particles of cosmic radiation at sea level

Periodical : Dok. AN SSSR 102/1, 57-60, May 1, 1955

Abstract : A new method for measuring the masses of particles of cosmic radiation is described. Basically, the new method consists of measuring impulses of ionization produced by a cosmic radiation particle in the free mass of the 4-layer proportional counter inserted between the magnetic poles of the instrument. The complete spectra of nucleous-active particles were constructed with the help of this new method. Three USSR references (1951-1954). Tables; diagrams.

Institution : .....

Presented by : Academician A. I. Alikhanov, January 28, 1955

Translation - D 407005

LYUBIMOV, V.A.

USSR/Physics - π - mesons

Card 1/1 Pub. 22 - 15/59

Authors : Lyubimov, V. A.; Eliseev, G. P.; and Kosmachevskiy, V. K.

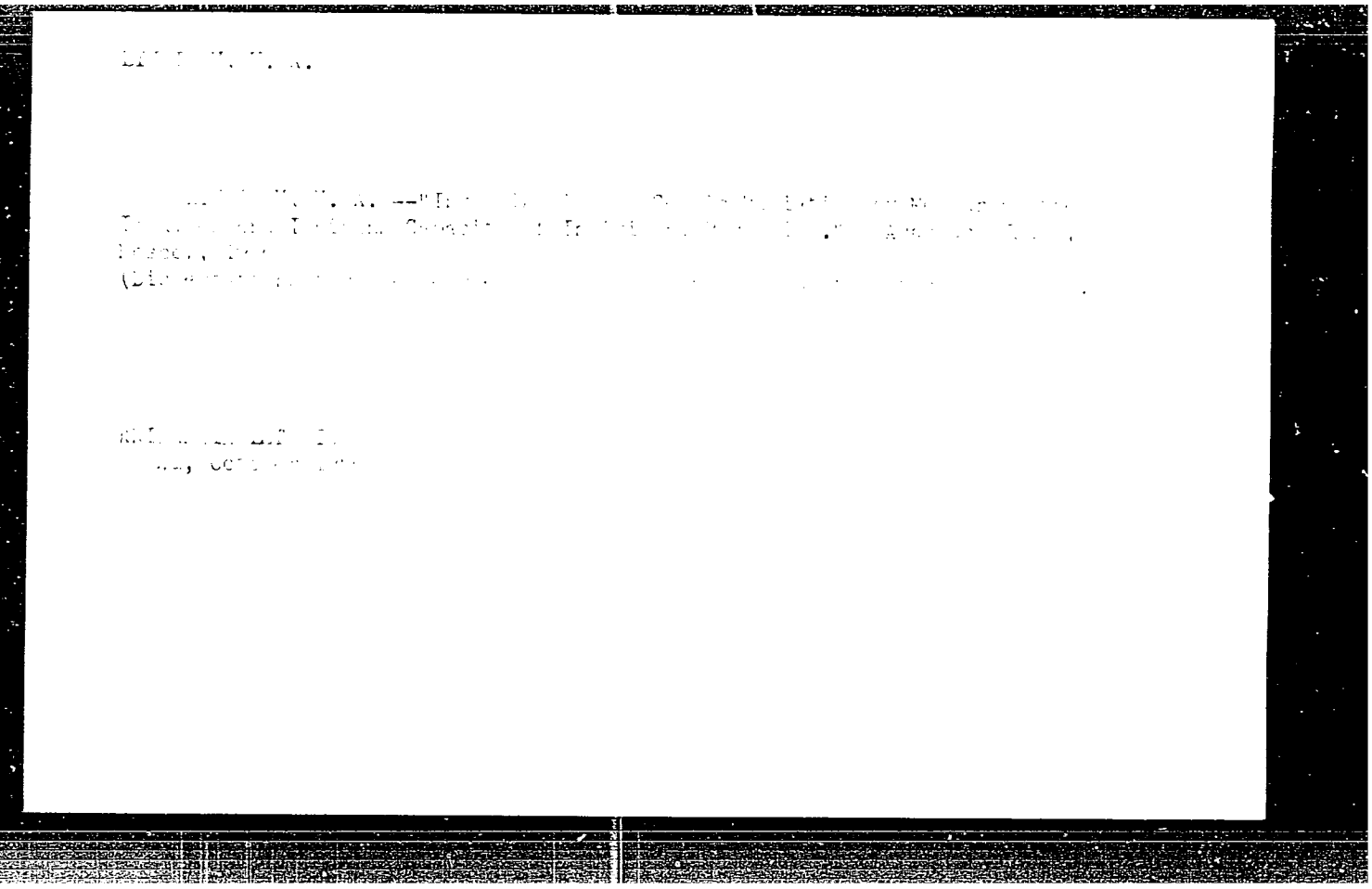
Title : Spectra of the π-Mesons under lead filters of various thicknesses at sea level

Periodical : Dok. AN SSSR 102/2, 249-251, May 11, 1955

Abstract : Experiments with π - mesons, conducted with the help of a spectrograph equipped with a 4-layer proportional counter, are described. The experiments were conducted to obtain π -meson spectra measuring the ionization and pulses of nuclear stops in the catching filters for which 2, 5, 10 and 40 cm lead films were used. Five references: 1 French and 4 USSR (1952-1955). Graphs.

Institution : .....

Presented by : Academician A. I. Alikhanov, January 20, 1955



Lyubimov, V.A.

Primary ionization spectrum for fast μ mesons. G. P. Eliseev, V. A. Lyubimov, and A. M. Frolov. Soviet Phys. "Doklady" 1, 163-70(1956)(English translation).—See C.A. 51, 885g. B. M. R.

Lyubimov, V. A.

USSR/Nuclear Physics - Penetration of Charged and Neutral Particles Through Matter, C-6

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34095

Author: Eliseyev, G. P., Lyubimov, V. A., Frolov, A. M.

Institution: None

Title: Spectrum of Primary Ionization of Rapid Mu-Mesons

Original Periodical: Dokl. AN SSSR, 1956, 107, No 2, 233-235

Abstract: With the aid of 2 10-layer low-efficiency counters, filled with a mixture of neon and commercial propane, investigation was made of the primary ionization of mu-mesons with momenta in the range 2×10^8 -- 3.4×10^{10} ev/sec. A total of 1,779 mu-mesons were recorded. All particles were broken up by momenta into 10 groups, for each of which the average momentum and ionization were determined. The results of the measurements agree qualitatively with the theoretically predicted logarithmic increase in the primary ionization and confirm the saturation of the primary ionization for mu-mesons with momenta greater than 10^{10} ev/sec, due to the effect of polarization of the medium. The method of processing the experimental data on the primary ionization used by the authors is described.

1 of 1

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001031210011-1"

Lyubimov V.A.

ALIKHANOV, A. I., ERSHLER, B. V., LYUBIMOV, V. A., YAKIMOV, B. ..

(Acad. Sci. USSR)

"Measurement of Longitudinal Polarization of β Electrons,"

Paper submitted at the All-Union Conf. on Nuclear Reactions in Medium and Low Energy Physics, Moscow, 19-27 Nov 57.

LUBIMOV, V.A., ALIKHANOV, A.I. and YELISEYEV, G.P.

High precision measurement of the ionizing power of fast charged particles with the help of multi-layer proportional counters (II [illegible])

CERN-Symposium on High Energy Accelerators and Pion Physics.

Geneva, 11-2[illegible] June [illegible]
In. Branch #5

appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957.

APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001031210011-1"

56-6-12/56

AUTHOR ALIKHANOV, A.I., YELLISEYEV, I.P., LYUBIMOV, V.A. ERSHLER, B.V.

TITLE The Polarization of Electrons on the Occasion of β-Decay. (Polyarizatsiya elektronov pri β-raspade- Russian)

PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 6, pp 1344-1349 (U.S.S.R.)

ABSTRACT In connection with the checking of the law of conservation of parity, the authors carried out experiments concerning the discovery of a longitudinal polarization of electrons on the occasion of β-decay. For the determination of this polarization the effect of the azimuthal asymmetry was used; it occurs on the occasion of the simple scattering of electrons polarized vertical to the direction of motions through a large angle on a thin foil of a heavy element. The longitudinally polarized β-electrons were sent through an electric field crossed by a magnetic field. In these crossed fields a transversal polarization occurred in the electrons. The reasons why this method should be favored are given. The numerical parameters of the measuring device used here are given. Measurements were carried out in the energy domains of 300 keV. At an electric field strength of 18,3 keV/cm and a magnetic field strength of H"= 79 Oe the spins were turned by the angle of $\varphi \sim 50^{o}$. The expected amount of the azimuthal asymmetry can be determined from the data given in a table. For the expected effect of azimuthal asymmetry in the plane which is vertical to the direction of spin the value δ_{exp} = 27,7% is found.

Card 1/2

56-6-12/56

The Polarization of Electrons on the Occasion of β-Decay.

Measuring results are given in a further table. They show that there is no asymmetry in the plane of the turn of the spin by $\theta = 180^{\circ}$. An asymmetry is observed in the plane $90-270^{\circ}$, where the sign changes if the direction of the field is reversed. The sign of asymmetry is determined by the fact that on the occasion of β-decay the electrons are emitted with a spin directed against the motion of the electrons. For the degree of the polarization of the electrons on the occasion of β-decay the expression $\beta(17,4\pm2,6)/27,7 = (0,63\pm0,09)\beta$ is found. The experiments concerning the measuring of the polarization of electrons in the case of β-decay tend to show that parity is not conserved in the case of weak interaction and that the theory of the two-component neutrino suggested by Landau agrees with the experiment.
(4 tables).

ASSOCIATION Not Given.
PRESENTED BY
SUBMITTED 30.3.1957
AVAILABLE Library of Congress.
Card 2/2

LYUBIMOV, V. A. (Moscow, USSR)

Non conservation de la parite dans la desintegration beta et les types d'interaction."

report presented at the Intl. Congress for Nuclear Interactions (Low Energy) and Nuclear Structure(Intl. Union Pure and Applied Physics) Paris, 7-12 July 1958.

ALIKHANOV, A.I., YELISEYEV, G.P., LYUBIMOV, V.A., and ERSHLER, B.V.

"Polarization of Electrons Emitted in β -Decay,"
Nuclear Physics, Vol. 5, No 4, 1958. (N. Holland Publ. Co., Amsterdam)

USSR Acad. Sci., Moscow.

Abst: In connection with a reconsideration of the law of conservation of parity some experiments have been performed with the purpose of detecting longitudinal polarization of electrons emitted in β -decay. It was found that the spin of the emerging β -electrons is opposite to the direction of electron motion. The magnitude of the longitudinal polarization agrees with the theoretical value, v/c, v being the electron velocity.

ALIKHANOV, A. I., YELISEYEV, G. P. and LYUBIMOV, V. A.

"Measurement of Longitudinal Polarization of Electrons Emitted in - Decay" Nuclear Phsyics, vol. 7, No. 6, p. 655-671. 1958. (No. Holland Publ. Co.)

USSR Academy of Sciences, Moscow.

Abstract: The longitudinal Polaraization of Coulomb - transistion electrons has been measured for several electron energies. The polarization value was found to be equal to v/c for all the substances measured. It is proved that the most problable relationships among the coupling constants in -decay are

C = -Ctm Cs = -Cs Cv Ca = C'a.

AUTHORS: Alikhanov, A.I., Yeliseyev, G.P., Lyubimov, V.A., Orshler, B.V. 56-34-4-1/60

TITLE: Electron Polarization in β-Decay (Polyarizatsiya elektronov pri β-raspade)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 4, pp. 785 - 799 (USSR)

ABSTRACT: The authors reported already in a short communication (reference 1) on experiments in which a longitudinal polarization of the β-electrons was found. This work now describes more exactly these experiments and control measurements. The experimental arrangement consisted of a device for measuring the turning of the spin and of a device for the measurement of the intensity of the electrons, which were scattered through a wide angle, at various azimuthal angles between 0 and 360°. The apparatus for the turning of the spin consisted of an oblong electric capacitor which was in a metal vacuum tube. Then the authors shortly report on the accuracy of the measurement of the electric and of the magnetic

Card 1/4

field. The source of the β-electrons was laid upon a 10 μ thick aluminium support as an even spot with a diameter of 1 cm. The source consisted of segregations from fraction solutions (oskolochnyy rastvor) of Sr^{90} with an admixture of Sr^{89}. The spectrum of the electron energies of such a source is plotted in a diagram. The thickness of the source plays an essential role in such measurements. That part of the device in which there were the scatterer of the electrons and the counters was separated from the capacitor by a thin colloidal film. For the computation of the expected effect of the azimuthal asymmetry the angle of rotation of the electron spin in crossed fields and the dependence of the azimuthal asymmetry on the scattering angle and on the energy of the polarized electrons must be known. A quite complicated term for $\sin\varphi$ is obtained, where φ means the angle of rotation of the spin. The amount of $\sin\varphi$ depends to quite a degree on the energy of the electron and this especially in the case of high energies. 3 tables illustrate the experimental results for 3 series of measurements at energies of ~300 keV and a fourth table

Card 2/4

gives the results for energies of ~750 ke V. Various details are discussed. An asymmetry in the direction 0 - 180° exists that changes its sign in the case of a change of the signs of the fields. Their mean value is (14,5 ± 8,5)%. In the direction 90 -270° the asymmetry is (42,8 ± 4,8)%. The data obtained on the polarization need a correction because of the multiple scattering at the scattering foils. The degree of polarization has at a mean energy of 300 keV resp. 750 keV with an accuracy of 15% resp. 40% the value -v/c. Finally the authors thank K.A. Ter-Martirosyan for the derivation of the formula of the spin rotation in the crossed fields; L. Ya. Suvorov, M. P. Anikina, and V. D. Laptev for the production of the strontium source; A. S. Kronrod for the computation of the light intensity of the device and M. Ye. Vishnevskiy for his useful data on the role of multiple scattering. There are 4 figures, 7 tables, and 12 references, 6 of which are Soviet

Electron Polarization in β-Decay

56-34-4-1/60

ASSOCIATION: Akademiya nauk SSSR (AS USSR)

SUBMITTED: February 3, 1958

1. Electrons—Polarization 2. Beta particles—Decay

Card 4/4

SOV-[illegible]-1-61

AUTHORS: Alikhanov, . I., Beliayev, S. T., Lubimov, V. .

TITLE: The measurement of the longitudinal polarization of the Electrons Emitted in β-Decay of Tm^{170}, Lu^{177}, Au^{198}, Sm^{153} Re^{186}, Sr^{90} and Y^{90}. (Izmereniye prodol'noy polyarizatsii elektronov, ispuskayemykh pri β-raspade Tm^{170}, Lu^{177}, Au^{198}, Sm^{153}, Re^{186}, Sr^{90} i Y^{90}. II)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 5, pp. 1045-1057 (USSR)

ABSTRACT: The authors try to measure, as precisely as possible, the longitudinal polarization of electrons with various energies for elements with Coulomb (Kulon) transitions, such as Tm^{170} (J = 1;yes), Re^{186} (J = 1; yes), Sm^{153} (J = 1,0; yes), Au^{198} (J = 0; yes) and Lu^{177} (J = 1; yes) or (J = 0; yes). These elements contain a mixture of Gamow (Gamov) - Teller interactions and Fermi interactions. For the purpose of comparison, the authors also carried out measurements at Sr^{90} and Y^{90}, which have "unical" transitions and a pure Gamow (Gamov)-Teller interaction. The longitudinal polariza-

Card 1/3

The Measurement of the Longitudinal Polarization of the Electrons [illegible] in β-Decay of Tm^{170}, Lu^{177}, Au^{198}, Sm^{153}, Re^{186}, Sr^{90} and Y^{90} SOV/56-[illegible]-1

tion was measured according to the method of Mott-scattering, i.e. by determination of the azimuthal asymmetry in the single scattering of transversely polarized electrons by a scatterer with great Z into a great angle. The measuring device and the measuring method are discussed. The authors then discuss the calculation of the extrapolated value of the azimuthal asymmetry of single scattering and the calculation of the expected value of the azimuthal asymmetry of scattering. The results of the measurements discussed in this paper lead to the following conclusions:
1) The longitudinal polarizations of the electrons of all the investigated elements are equal, with an accuracy of 2 to 11 %. 2) For the average value with respect to all elements the longitudinal polarization of the electrons is equal to v/c with an accuracy of [illegible] %. 3) Within the range of from 1[illegible] to [illegible] keV the longitudinal polarization of the electrons of the Coulomb [illegible] does not depend on the energy (with an accuracy of [illegible] ÷ 7 %). A formula is given for the Coulomb transitions which are forbidden in the first order.

Card 2/3

The Measurement of the Longitudinal Polarization of the Electrons Emitted in β-Decay of Tm^{170}, Lu^{177}, Au^{198}, Sm^{153}, Re^{186}, Sr^{90} and Y^{90}. II SOV/56-34-5-1/61

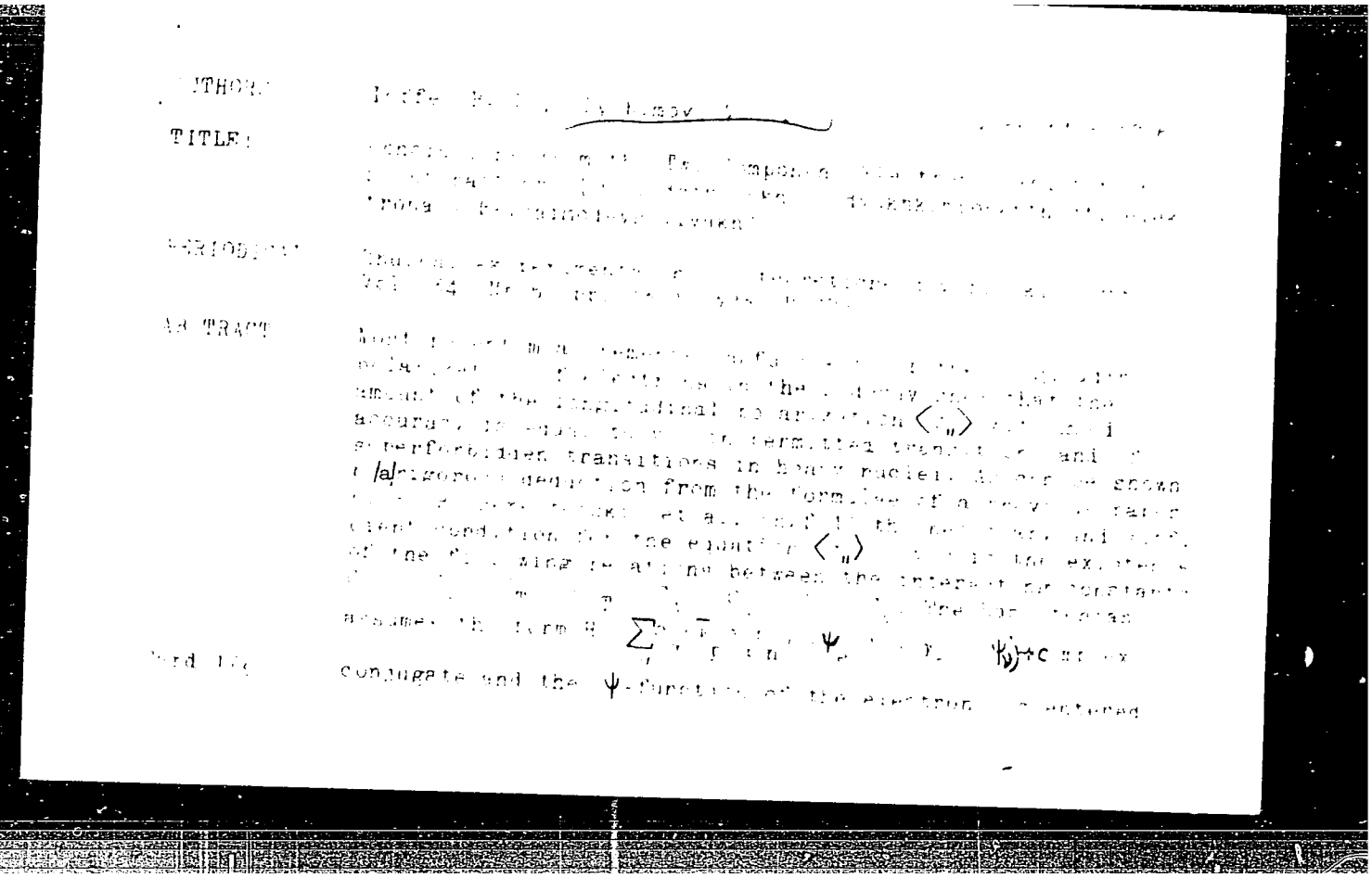
There are 6 figures, 2 tables, and 9 references, 5 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR (AS USSR)

SUBMITTED: December 12, 1957

1. Electrons—Polarization measurement 2. Electrons—Sources 3. Beta decay 4. Chemical elements—Properties 5. Mathematics—Applications

Card 3/3



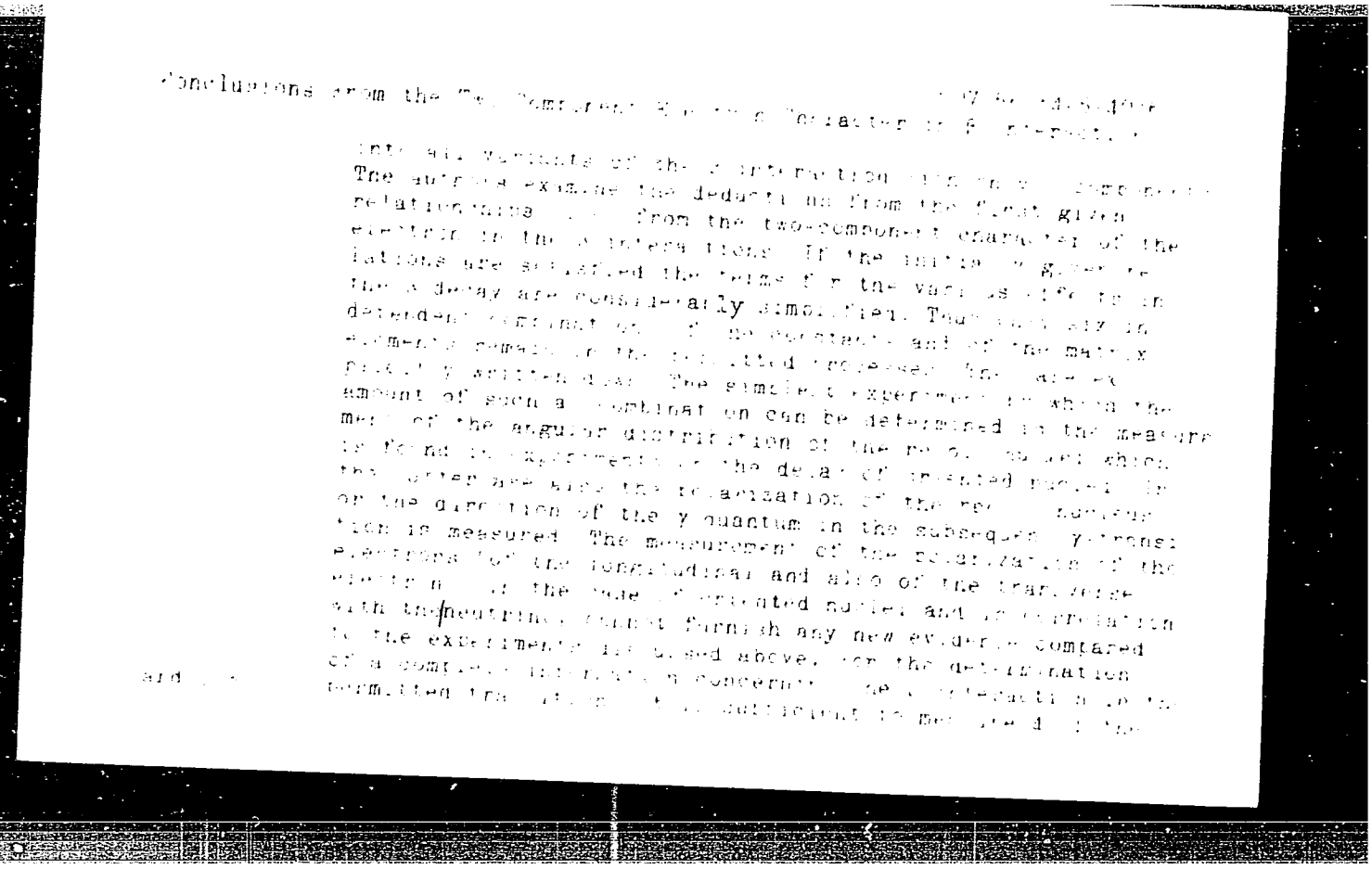
AUTHOR:

TITLE:

PERIODICAL:

ABSTRACT:

Card 1/2



[illegible] from the two components [illegible] character [illegible] SOV [illegible] 4 [illegible]

[illegible] expected quantities. There are 7 references, [illegible] Soviet.

[illegible] December [illegible]

1. Electrons—Polarization—Analysis 2. Beta decay 3. Electron transitions

Card [illegible]

21(8) SOV/56-35-4-50/52

AUTHORS: Alikhanov, A. I., Yeliseyev, T. P., Lyubimov, V. A.

TITLE: The Polarization of the Electrons of RaE and Time-Parity (Polyarizatsiya elektronov RaE i vremennaya chetnost')

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 4, pp 1061-1062 (USSR)

ABSTRACT: In an earlier paper (Ref 1) the authors showed that the longitudinal electron polarization in β-decay acts of heavy nuclei (which corresponds to transitions forbidden in the first order, i.e. the so-called Coulomb (Kulon) transitions ($\Delta J \neq 2$) and the unical transitions ($\Delta J = 2$, ja)) is equal to v/c with 5% accuracy and is independent of electron energy. However, in one case (RaE) an anomaly in the shape of the β-spectrum is observed in spite of the Coulomb transition ($1^- \rightarrow 0^+$). By employing a method already described (Ref 1) the authors determined the longitudinal electron polarization at the medium energies $\bar{E}$ = 125 and 390 keV. The Ra(D+E)-source with an intensity of 5 m Cu had a thickness of about 0.8 mg/cm^2. With $\bar{E}$ = 125 and 390 keV the longitudinal polarization $-\langle \sigma \rangle$ c/v

Card 1/2

The Polarization of the Electron of RaE and Time-Parity

of the electrons amounted to 0.73 ± 0.06 and 0.725 ± 0.06 (mean value 0.73 ± 0.04). B. B. Geshkenbeyn, S. A. Nemirovskaya and A. P. Rudik calculated the longitudinal electron polarization of RaE for the VA- and ST-variants in consideration of the non-conservation of spatial parity, but with conservation of parity with respect to time (but also for the case of the non-conservation of time-parity). The disturbance of time-parity is less than 7.5%. This is the most accurate estimate of the conservation of parity with respect to time that has hitherto been made. Possibilities of a further improvement of this estimation are pointed out in short. There are 8 references, 2 of which are Soviet.

SUBMITTED: August 2o, 1958

Card 2/2

21(8)

AUTHORS: Lyubimov, V. A., Vishnevskiy, M. Ye.

SOV/56-35-6-39/44

TITLE: Measurement of the Polarization of Electrons of Internal Conversion Following a β-Decay (Izmereniye polyarizatsii elektronov vnutrenney konversii, sleduyushchey za β-raspadom)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 6, pp 1577-1579 (USSR)

ABSTRACT: The present paper gives the results obtained by the above mentioned measurement for Hg^{203} β-decay $\left(\frac{}{} \xrightarrow{\beta} 3/2 + \xrightarrow{e_K} 1/2 + \right)$. The β-electrons are recorded by means of 2 counters. Recording of the conversion electrons is described in short. Azimuthal asymmetry was measured by the scattering of the conversion electrons on a gold scatterer (0.4 mg/cm^2); a calculation formula is written down. The asymmetry due to the measuring apparatus was determined by scattering on an aluminum scatterer. After this correction has been taken into account, $\alpha = \alpha_{Au}/\alpha_{Al} = 1.15 \pm 0.05$ is obtained.

Card 1/3

Measurement of the Polarization of Electrons of Internal Conversion Following a β-Decay

By taking account of the finite thickness of the scatterer, $\alpha_{corrected} = 1.21 \pm 0.07$ is obtained. Thus, the conversion electrons produced after the β-decay of Hg^{203} were polarized inversely to the direction of β-electron emission. The spin and the parity of the ground state of Hg^{203} are not known. However, because of ln(ft) = 6.4 this spin value probably does not differ by more than 1 from the spin of the excited Tl^{203}-level, to which the β-decay leads. The expected values α for the spins $5/2_{\pm}$, $3/2_{\pm}$, $1/2_{\pm}$ of the ground state of Hg^{203} at an average energy of $\sim$100 keV amount to from $\alpha_{5/2} = 0.87$, $\alpha_{3/2} = 0.95$ to 1.15, $\alpha_{1/2} = 1.25$. Measuring results make it appear highly probable that the ground state spin of Hg^{203} is 1/2 and not 5/2. Thus, the lack of a direct β-transition of Hg^{203} to the ground state of Tl^{203} cannot be explained by a prohibition with re-

Measurement of the Polarization of Electrons of Internal Conversion Following a β-Decay

spect to moments. The authors thank A. I. Alikhanov, Academician, for his interest in this work. There are 4 references, 3 of which are Soviet.

SUBMITTED: October 10, 1958

24(7)
AUTHORS: Alikhanov, A. I., Yeliseyev, G. P., SOV/56-36-2-9/63
Kamalyan, V. Sh., Lyubimov, V. A., Moiseyev, B. [illegible], Khrimyan, A. [illegible]

TITLE: Investigation of the Nature and the Spectra of Particles Produced by High Energy Nucleons (Issledovaniye prirody i spektrov chastits, generirovannykh nuklonami vysokoy energii)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 2, pp 404-410 (USSR)

ABSTRACT: In the present paper the authors publish the results obtained by the investigation of particles which were produced by high-energy nucleons of cosmic radiation at an altitude of 3200 m above sea level. Investigations were carried out on Mount Aragats in Armenia. The experimental device used is shown by figure 1 in form of 2 sections which are vertical to each other. The device, in principle, consists of a mass spectrometer (6850 Oe), an additional hodoscope arrangement, and a five-layer thin-walled proportionality counter. Two series of measurements were carried out: with generators (10 and 25 cm lead) and control tests "without generators" (0.3 - 2 cm lead total substance thickness). Measuring results can be divided into 2 groups: a) particles produced in the generators by neutral radiation,

Card 1/4

Investigation of the Nature and the Spectra of Particles Produced by High Energy Nucleons

b) particles of stars produced by charged particles and single charged particles. Muons were excluded by means of the momentum-range method. Figures 1a,b show the results of momentum- and ionization measurements of secondary particles under 25 cm of lead of groups a) and b). Sufficient data could be obtained from the experimental material concerning secondary protons and partly also concerning deuterons. In 2 series of measurements carried out in the momentum range of 400-900 Mev/c 35 deuterons were observed, 10 of which had been produced by protons. Thus, cosmic radiation in an altitude of 3250 m had 3.5 times as many neutrons as protons. The momentum spectrum of deuterons in the "generatorless" tests with momenta >800 Mev/c had the form $N(p) \sim p^{-\gamma}$, ($\gamma \approx 2$). Figure 3 shows the differential momentum spectrum of π^--mesons which had been produced by neutrons, viz. measurements of shower-mesons and of single mesons (momenta: 400 - 7000 Mev/c); the course corresponds to $N(p) \sim p^{-\gamma}$, where γ for the shower 1.7 for single π^--mesons is equal to 2.4 . Khrimyan and Asatiani (Ref 4) found γ = 1.5 for the π^--meson spectrum (shower), but they investigated the π^--meson production by protons.

Card 2/4

Investigation of the Nature and the Spectra of Particles Produced by High Energy Nucleons

In the momentum range of 125-700 Mev/c the mean value [illegible] was obtained for N_{π^-}/N_{π^+} as a result of neutron action, and for stars produced by protons $N_{\pi^-}/N_{\pi^+} = 45/54$ was obtained. In figure 2 the mass distribution of the recorded particles is represented in the momentum range of 125-720 Mev/c (ionization $1.3 - 7I_{min}$) separately for single particles produced by neutrons and for multiple stars produced by neutrons. Particles with a mass 700-1300 m_e were determined as amounting to 10% (measured according to the proton number). As regards the K-mesons determined, it may be seen from table 1, which gives a detailed account of all measuring results, that $N_{K^+}/N_{K^-} = 16/3$, and that in consideration of the producing particles, it holds that $N_{K^\pm}(p)/N_{K^\pm}(n) = 14/5$. Finally, a large number of investigation results concerning π^- and K-mesons in the momentum range of 720-900 Mev/c is given. The authors in conclusion thank Professor A. I. Alikhanyan for his interest and discussions.

Card 3/4

Investigation of the Nature and the Spectra of Particles Produced by High Energy Nucleons

and they express their gratitude to V. K. Kosmachevskiy, I. P. Karabekyan, V. I. Kanavets and V. V. Avakyan for their great help in organizing and carrying out the work.
There are 4 figures, 2 tables, and 6 references, 4 of which are Soviet.

SUBMITTED: August 20, 1958

Card 4/4

21(1) SOV/56-36-4-69/70

AUTHORS: Alikhanov, A. I., Lyubimov, V. A.

TITLE: On the Possibility of Determining Muon Spirality by Means of δ-Electron Showers From Magnetized Iron (O vozmozhnosti opredeleniya spiral'nosti myuona po δ-elektronnym livnyam iz namagnichennogo zheleza)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 4, pp 1334-1335 (USSR)

ABSTRACT: The nonconservation of spatial parity in the case of weak interaction causes muons formed in pion- (or $K_{\mu 2}$-meson-) decay to have polarization. The direction of this muon polarization has hitherto not been experimentally determined. The authors suggest a theoretically justified method of measuring the direction and the amount of polarization, and investigate the possibility of carrying out such experiments with accelerators and in cosmic radiation. This is done on the basis of a formula given by Berestetskiy for the scattering cross section of polarized muons on polarized electrons. This formula shows that the cross section is independent on polarization and that, if the energy transfer of electrons in collisions with high-energy polarized

Card 1/3

On the Possibility of Determining Muon Spirality by Means of δ-electron Showers From Magnetized Iron

muons is great, it may assume considerable values. This may be the case with a δ-shower having a certain number of particles, which is caused by muons in magnetized iron. According to the avalanche theory for the probability $f(\varepsilon,n)$ of the occurrence of a shower caused by polarized muons in magnetized iron with an electron number $> n$ the formula

$$b(E,n) = \int_0^{\varepsilon_m(E)} f(\varepsilon,n) \quad (E,\varepsilon)d\varepsilon = b_o(E,n) + \vec{P}_e \vec{P}_\mu b_1(E,n)$$ is given.

(ε = energy of δ-electrons, b_o denotes the polarization-independent and b_1 the polarization-dependent probability for the occurrence of such a shower. For $P_e = 8\%$ a number of numerical values is given.) Measurements of muon chirality by means of the method described can be carried out also on muons of cosmic radiation. A similar equation is written down for the probability of a shower formation with particle number $> n$ by a cosmic muon,

Card 2/3

SOV/56-36-4-69/7[illegible]

On the Possibility of Determining Muon Spirality by Means of γ-Electron Showers From Magnetized Iron

and again numerical data are given for $P_e = 8\%$ The authors thank V. B Berestetskiy for discussions. There is 1 Soviet reference.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki Akademii nauk SSSR (Institute for Theoretical and Experimental Physics of the Academy of Sciences, USSR)

SUBMITTED: February 21, 1959

Card 3/3

LYUBIMOV, V.

"Measurment of Muon Spirality"

paper presented at the Intl Conference on High Energy Physics, Rochester, N.Y. and/or Berkly California, 25 Aug - 16 Sep 1960.

S/048/60/024/009/001/015
B013/B063

AUTHOR Lyubimov, V. A.

TITLE Modern Concept of the Beta Decay 19

PERIODICAL Izvestiya Akademii nauk SSSR Seriya fizicheskaya 1960
Vol 24, No 9, pp 1021 - 1034

TEXT Due to the changed view of space and time the fundamentals of the classical theory of beta decay had to be revised. The present paper only deals with the most outstanding experimental and theoretical publications which led to the gradual development of the modern concept of weak interactions and beta decay The following problems were treated in these publications: longitudinal polarization of electrons; representation of the electron by two components in the theory of beta decay (Refs. 3 - 9); theory of the two-component neutrino (Refs. 3 and 10 - 17); universal four fermion interaction (Refs. 18 - 23); space reflection and time parity (Refs. 2, 3, 20, and 24 - 26). All fundamental conclusions of the modern theory of beta decay were experimentally confirmed at the end of 1958 These conclusions are as follows: 1) allowed transitions of the Fermi shape of the beta

Card 1/3

Modern Concept of the Beta Decay

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B013/B063

spectrum; 2) the total polarization of the electrons is equal to v/c; 3) the neutrino consists of two components (variants A and V), 4) the vectorial constant is not renormalized; 5) time parity is conserved. However it should be added that these conclusions were verified by experiments which for the major part, had a qualitative character, that is to say in the first approximation. The next stage should be a quantitative verification of the theory. When exact calculations are made in which even slight but characteristic effects are taken into account, the logic of the theory may lead to certain deviations from the "standard". The determination of such "anomalies" also might confirm the theory further. The following deviations are concerned: 1) the weak magnetism according to Gell Mann (Refs. 27 - 29); 2) deviation of the spectrum from the Fermi shape and deviation of electron polarization from v/c (Refs. 8 and 30 - 47); 3) equality of the constants in different weak interaction processes (Refs. 48 - 50). Finally the author discusses the structure of weak interaction and the range of application of the universal four-fermion interaction (Refs. 5 and 51 - 53). At present weak interactions are represented in two ways: interaction of fermions via a vectorial intermediate boson (Figs. 1 and 2) and a direct four fermion

Card 2/3

Modern Concept of the Beta Decay

S/048/60/024/009/001/015
B013/B063

interaction. The author thanks A. I. Alikhanov and B. L. Ioffe for discussing the paper. L. D. Landau, S. S. Gershteyn, Ya. B. Zel'dovich, B. V. Geshkenbeyn, S. A. Nemirovskaya, A. B. Rudik, P. Ye. Spivak, A. I. Alikhanov, and G. P. Yeliseyev are mentioned. There are 3 figures and 54 references: 18 Soviet.

Card 3/3

83670

S/048/60/024/009/003/015
B013/B063

24.6800

AUTHORS: Lyubimov, V. A., Alikhanov, A. I.

TITLE: The Effect of a Magnetic Field on the Resonance Absorption of Gamma Rays

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 9, pp. 1076 - 1078

TEXT: For the purpose of studying the Zeeman effect, the authors used the 23.8-kev γ-transition in Sn^{119*} (lifetime: $2.67 \cdot 10^{-8}$ sec, i.e., level width: $2.5 \cdot 10^{-8}$ ev). Prior to the investigation of the effect of a magnetic field upon resonance radiation and absorption without recoil, the authors made experiments to determine the temperature dependence of resonance absorption (Fig. 1, I) and of the resonance absorption cross sections (Fig. 1, II). A tin sample enriched in Sn^{118} (96%) was used. The Sn^{112} content was below 0.05%. The Sn^{119} impurity amounted to ~1.0%, that is to say, its relative content was nine times lower than in a natural

Card 1/3

The Effect of a Magnetic Field on the Resonance Absorption of Gamma Rays

S/048/60/024/009/003/015
B013/B063

mixture. The experiments made it possible to determine the magnitude of the resonance effect under the present experimental conditions and to compare it with theoretical curves. Furthermore, the authors were able to measure the effective Debye temperature of white tin. The effect of a magnetic field on the resonance absorption of γ-rays was measured by a proportional counter (Fig. 2). When the magnetic field was switched on (with a cold source and a cold absorber), the intensity of soft radiation was found to rise with increasing field strength. By splitting the 23.8-kev level, the magnetic field caused a shift of the radiation energy without recoil from the resonance energy by the order of 10^{-7} ev. At the same time, there was a much smaller shift of the 23.8-kev level in the absorber which was placed in a weaker magnetic field. As a result of this energy difference, the absorption in the absorber diminishes, while intensity increases. Fig. 2 shows the experimental points and the curves calculated for the resonance effect of the respective magnetic fields for different values of the magnetic moment of the 23.8-kev level. The authors thank L. A. Artsimovich for supplying the enriched tin samples, G. M. Kukavadze for the mass-spectrometric analysis, and V. I. Anan'yev for his assistance in the measurements. There are 2 figures and 2 non-Soviet references.

83670

The Effect of a Magnetic Field on the Resonance Absorption of Gamma Rays

S/048/60/024/009/003/015
B013/B063

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki Akademii nauk SSSR (Institute of Theoretical and Experimental Physics of the Academy of Sciences USSR)

Card 3/3

83576

S/056/60/038/005/009/059
B006/B070

24.6520

AUTHORS: Vishnevskiy, M. Ye., Lyubimov, V. A., Tret'yakov, Ye F, Grishuk, G. I.

TITLE: Investigation of the Polarization of Internal Conversion Electrons Following the β^--Decay of Heavy Elements

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 5, pp. 1424-1429

TEXT: The polarization of internal conversion electrons in transitions following β^- decays was predicted by A. I. Alikhanov and V. A. Lyubimov, and experimentally discovered by Lyubimov and Vishnevskiy. The theory of this effect was developed by V. B. Berestetskiy, A. P. Rudik, and B. V. Geshkenbeyn. The results of the present work were communicated to the International Conference on the Physics of High Energies (Kiyev, July 1959). The authors investigated the polarization of conversion electrons for transitions following the β^- decay of Tm^{170}, Re^{186}, Hg^{203}, and Pa^{233}. The apparatus they used is schematically shown in Fig. 1. The arrangement and the method of the experiments are briefly discussed in the introduction.

Card 1/3

83576

Investigation of the Polarization of Internal Conversion Electrons Following the β^--Decay of Heavy Elements

S/056/60/038/005/039/050
B006/B070

The results are individually discussed for the various isotopes. The conversion electrons were found to be polarized in the direction of the emitted β-particles for Tm^{170} and Re^{186}, and in the opposite direction for Hg^{203} and Pa^{233}. The results obtained are compared in part with those of other authors. Tm^{170}: $2S\langle\sigma\rangle = 0.19 \pm 0.03$, and with a correction for the finite thickness of the scatterer according to Alikhanov, Lyubimov, and G. P. Yeliseyev: $(2S\langle\sigma\rangle)_0 = 0.22 \pm 0.03$. The polarization of the conversion electrons yielded $\langle\vec{\sigma}\rangle_{exp} = (0.49 \pm 0.06)\vec{v}/c$, the average value of v/c for the β-particles recorded being 0.78. The results are compared with the theory of Geshkenbeyn, which gives $\langle\vec{\sigma}\rangle_{theor} = +0.488\ \vec{v}/c$. Pa^{233}: The following values were obtained for an asymmetry factor of scattering $R = 1.10 \pm 0.02$, when corrections were made for the finite thickness of the scatterer (0.45 mg/cm^2) and for the admixture of cascade transitions: $\langle\vec{\sigma}\rangle = (-0.048 \pm 0.14)\ \vec{v}/c$ for an average value of $v/c = 0.56$. For the possible spin values in the ground state of Pa^{233}, the theoretical results

Card 2/3

83576

Investigation of the Polarization of Internal Conversion Electrons Following the β^--Decay of Heavy Elements

S/056/60/039/005/009/050
B006/B070

are: $\langle\vec{\sigma}\rangle_{1/2} = -0.334\ \vec{v}/c$, $\langle\vec{\sigma}\rangle_{3/2} = (-0.334 + +0.200)\vec{v}/c$, $\langle\vec{\sigma}\rangle_{5/2} = 0.200\ \vec{v}/c$. Hg^{233}: The polarization was experimentally found to be given by $\langle\vec{\sigma}\rangle = (-0.32 \pm 0.09)\ \vec{v}/c$ for an average value of $v/c = 0.55$. For the different possible spins, the calculations give: $\langle\vec{\sigma}\rangle_{\pm 1/2} = 0\ 495\ \vec{v}/c$, $\langle\vec{\sigma}\rangle_{\pm 3/2} = (0.495 + -0.297)\ \vec{v}/c$, $\langle\vec{\sigma}\rangle_{\pm 5/2} = -0.297\ \vec{v}/c$.

Re^{186}: The decay is analogous to that of Tm^{170}. No numerical data are given.

The authors thank Academician A. I. Alikhanov for his interest, B. V. Geshkenbeyn for discussions, and V. N. Markizov for his help. B. S. Dzhelepov and L. K. Peker are mentioned. There are 3 figures and 8 references: 7 Soviet and 1 US.

SUBMITTED: November 23, 1959

Card 3/3

85702

S/056/60/038/006/045/049/XX
B006/B070

24.6210
AUTHORS: Lyubimov, V. A., Alikhanov, A. I.

TITLE: Effect of a Magnetic Field on the Resonance Absorption of Gamma Rays

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 6, pp. 1912 - 1914

TEXT: The emission and resonance absorption of gamma rays without loss of energy during nuclear recoil discovered by Mossbauer, permits an immediate observation of the Zeeman splitting of excited nuclear levels and measurement of their magnetic moments. The gamma transition in Sn^{119m} (23.8 kev; lifetime, $2.67 \cdot 10^{-8}$ sec; level width, $2.5 \cdot 10^{-8}$ ev) was selected for the observation of the Zeeman effect, and some results pertaining thereto are reported in this "Letter to the Editor". It was necessary to use a sample enriched to 96% in Sn^{118} in which the fraction of Sn^{112} was less than 0.05%, as the In^{113} produced from Sn^{112} is a strong source of ~24 kev X-rays. A magnet with pyramid shaped pole pieces (6 mm gap) and capable of

Card 1/3

25702

Effect of a Magnetic Field on the Resonan e Absorption of Gamma Rays

S/056/60/038/006/045/049/XX
B006/B070

giving fields of up to 20,000 gauss was used for the determination of the field dependence of the resonance absorption. The size of the gamma source was 20 x 4 mm (5mg/cm^2). The absorption length of the 23.8-kev gamma rays in tin (on account of the photoeffect) was 70 mg/cm^2 and thus essentially larger than the resonance absorption length in the source and absorber. Source and absorber were cooled with liquid nitrogen. The measurements are described. Three different thicknesses of the absorber (natural white tin) were used for the measurements: 36, 11, and 5 mg/cm^2. The measured H dependence of the relative intensity changes is shown in a diagram. During measurement, the source temperature was 90°K and the absorber temperature, 293°K (with the thin absorber). The theoretically calculated curves for $\mu = 1.5\ \mu_0$ and $\mu = 2.0\ \mu_0$ are also shown in the diagram. The magnetic moment of the excited level of Sn^{119m} was determined from the data obtained. The values found are: $\mu = -(1.1 \pm 0.1)\mu_0$ or $\mu = (1.72 \pm 0.06)\mu_0$ for a Debye temperature $\Theta = 170°K$. μ_0 is the magnetic moment of the ground state

Card 2/3

35702

Effect of a Magnetic Field on the Resonance Absorption of Gamma Rays

S/056/60/038/006/045/049/XX
B006/B070

of Sn^{119} and equal to -1.046 nuclear magnetons. L. A. Artsimovich is thanked for preparing the enriched sample, G. M. Kukavadze for mass spectrographic analysis of the samples, and V. I. Anan'yev for help in the measurements. There are 1 figure and 2 references: 1 Soviet and 1 German.

ASSOCIATION: Institut eksperimental'noy i teoreticheskoy fiziki Akademii nauk SSSR (Institute of Experimental and Theoretical Physics of the Academy of Sciences USSR)

SUBMITTED: April 25, 1960

Card 3/3

Lyubimov, V. A

85706

S/056/60/038/006/049/049/XX
B006/B070

24 6900 (1138, 1191, 1559)

AUTHORS: Alikhanov, A. I., Galaktionov, Yu. V., Gorodkov, Yu. [illegible], Yeliseyev, G. P., Lyubimov, V. A.

TITLE: Measurement of the Chirality of the μ-Meson 19

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 6, pp. 1918 - 1920

TEXT: The muon chirality was measured by the authors of the present "Letter to the Editor" by a method described in Ref. 1. The method is based on the measurement of the scattering cross sections of polarized muons from polarized electrons. This cross section depends on the [illegible] orientation of the spins of the colliding particles. An independent measurement of the number of S showers was made, the showers being [illegible] by cosmic muons in magnetized iron and consisting of two or more particles. The experimental arrangement is shown in a Fig. and described in the text. About 500 muons pass through the apparatus every [illegible] two of these produce showers with $n \leq$ [illegible]. Up to [illegible] 16,000 showers [illegible] $n \geq 3$ have been recorded. The energies of the shower-producing [illegible]

Card 1/3

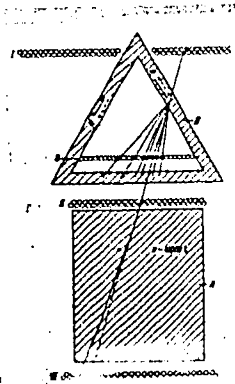
between 5 and 6.5 Bev. The following results were obtained [illegible] experiments: For μ^+ mesons, the difference in the number of showers [illegible] different directions of the current in the winding of the [illegible] gives the effect $\varepsilon_+ = -0.37 \pm 0.41$; ($\varepsilon = (N_+ - N_-)/(N_+ + N_-)$), for μ^- [illegible] $\varepsilon_- = +0.82 \pm 0.42$. For both signs of the charges of the [illegible] is given by $\varepsilon_\pm = 0.58 \pm 0.29$. The theoretical value for a [illegible] tion of the muon is 0.6. The sign of the effect corresponds to [illegible] interaction (according to which the spin of the muon is directed [illegible] to its momentum), that is, to a left-hand chirality of the μ^+ [illegible]. The probability for the effect to be zero or negative is $2 \cdot 10^{-2}$. The experiments are being continued to improve the statistical accuracy. There are 1 figure and 2 Soviet references.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki Akademii nauk SSSR (Institute of Theoretical and Experimental Physics of the Academy of Sciences USSR)

SUBMITTED: April 25, 1960

Card 2/3

S/056/60/038/006/049/049/XX
B006/B070



Legend to the Fig.:
I, II, III - hodoscope counters for the determination of the muon trajectories; S - counter series for shower recording; A - iron yoke of the permanent magnet for the determination of the sign of the muons from their deviation in the magnetic field; B - iron core of the electromagnet with triangular cross section in which the muons produce showers; the field induced in B attains 14,400 gauss.

Card 3/3

AUTHORS: Alikhanov, A. I., Eliseyev, G. P., Lyubimov, V. A.

TITLE: Longitudinal Polarization of Beta Electrons From Au^{198}

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 3 (9), pp. 587-588

TEXT: The authors measured the polarization of Au^{198} electrons by means of an apparatus resembling the one described in Ref. 4, but improved in order to work with a beta source exhibiting a strong gamma background. The measurements were made in the ranges of 145 kev and 390 kev. Equal Au^{198} and Tm^{170} samples served as sources. The corrections for the two samples were mutually compensating. At 145 kev, the longitudinal polarization of Au^{198} beta electrons was $P_{Au}/P_{Tm} = 0.80 \pm 0.05$ relative to Tm^{170}, and was thus smaller than -v/c. Comparable values were obtained by P. Ye. Spivak and L. A. Mikaelyan (Ref. 7). At 390 kev, $P_{Au}/P_{Tm} = 1.07 \pm 0.08$. A paper by B. V. Geshkenbeyn and A. P. Rudik is referred to as containing an explanation of the deviation from -v/c at low energies.

Card 1/2

Longitudinal Polarization of Beta Electrons From Au^{198}

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B004/B060

In the case of heavy nuclei, polarization for first forbidden transitions is to be expected to deviate from -v/c in that region of the beta spectrum where there is a deviation from the Fermi shape. There are 9 references: 6 Soviet, 5 US, and 1 Dutch.

SUBMITTED: April 30, 1960

Card 2/2

LYUBIMOV, V. A.

Doc Phys-Math Sci, Diss -- "Measurement of electron polarization in β-decay". Dubna, 1961. 13 pp, 21 cm (Joint Inst of Nuclear Research, Lab of Nuclear Problems), 160 copies, Not for sale, 21 ref in bibl on pp 12-13 (KL, No 9, 1961, p 174, No 24240). /61-530467

LYUBIMOV V.A. 2

PHASE I BOOK EXPLOITATION SOV/5914

Akademiya nauk SSSR. Fiziko-tekhnicheskiy institut im. A. F. Ioffe

Gamma-luchi (Gamma Rays) Moscow, Izd-vo AN SSSR, 1961. 720 p.
Errata slip inserted. 3300 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Fiziko-tekhnicheskiy institut im. A. F. Ioffe.

Resp. Ed.: L. A. Sliv, Doctor of Physics and Mathematics; Ed. of Publishing House: N. K. Zaychik; Tech. Ed.: A. V. Smirnova.

PURPOSE: This book is intended for theoretical and experimental physicists working in the field of nuclear spectroscopy and in related fields where gamma rays are utilized. It may also be useful to advanced students of physics.

COVERAGE: The book, representing a symposium of papers whose authors are specialists in their areas, attempts to provide the fullest possible coverage of theoretical and experimental methods of

Card 1/[redacted]

determining nuclear gamma-radiation characteristics and the use of gamma rays to study matter, particularly nuclear structure. The book contains a large number of tables, graphs, and nomographs and can be used as an encyclopedical manual on gamma rays. No personalities are mentioned. References accompany each part.

TABLE OF CONTENTS [Abridged]:

LYUBIMOV, V.A.

BABAYEV, A.I., BALATS, M.Ya., KAPTANOV, V.S., LANTSOVSKIY, L. G., LYUBIMOV, V.A., OBUKHOV, Yu. V.

"Search for $\mu^- \rightarrow e^-$ Decay"

report presented at the Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Inst. of Theoretical and Experimental Physics, Moscow, USSR

LYUBIMOV, V.A.

ALIKHANOV, A.I., BABAYEV, A.I., BALATS, M. Ya., KAFTANOV, V.S., LANDSBERG, L.G., LYUBIMOV, V.A., OBUKHOV, Yu. V.

"Search for $\mu \to e + \gamma$ Decays"

report presented at the Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Institute of Theoretical and Experimental Physics, Moscow, USSR

ALIKHANOV, A.L.; BABAYEV, A.I.; BALATS, M.Ya.; KAFTANOV, V.S.; LENDSBER, L.G.; LYUBIMOV, V.A.; OBUKHOV, Yu.V.

Further searching for the $\mu \to e + \gamma$ -decay. Zhur. eksp. i teor. fiz. 42 no.2:630-631 F '62. (MIRA 15:2)

1. Institut teoreticheskoy i eksperimental'noy fiziki.
(Mesons--Decay)

S/056/62/042/006/046/047
B104/B112

AUTHORS: Babayev, A. I., Balats, M. Ya., Kaftanov, V. S., Landsberg, L. G., Lyubimov, V. A., Obukhov, Yu. V.

TITLE: Search for the $\mu^+ \longrightarrow e^+ + e^+ + e^-$ decay

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 6, 1962, 1685-1687

TEXT: An attempt to find the $\mu \longrightarrow 3e$ decay was made with the apparatus shown in Fig. 1. The current of 70-Mev π^+ mesons was separated by coincidences in counters I, II, and O. The number of π^+ mesons stopped in counter O was determined from the number of $\mu^+ \longrightarrow e^+ + \nu + \bar{\nu}$ decays recorded by counters O and $\overline{III}$ ($1, 2, \bar{3} + 4, 5, \bar{6} + 7, 8, \bar{9} + 10, 11, \overline{12}$). Fast coincidences of any pair of lateral counters with a central counter generate a control signal which is amplified and fed to the high-voltage electrodes of two spark chambers. The particle tracks in the chambers are photographed and the interval between the stoppage of a π^+ meson and the generation of the control signal is measured simultaneously. The amplitude of the pulses generated in counter O by decay π^+ mesons and decay

Card 1/0

Search for the $\mu^+ \longrightarrow e^+ + e^+ + e^-$ decay

electrons is recorded by an oscilloscope. After 70 hrs of operation it was not possible to find a $\mu \longrightarrow 3e$ decay among $6.98 \cdot 10^8$ stops. There are 2 figures.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki
(Institute of Theoretical and Experimental Physics)

SUBMITTED: April 9, 1962

Fig. 1. Experimental apparatus.
Legend: (Ц) and (П) spark chambers; (K-1) and (K-2) motion-picture cameras; (З) mirror for stereoscopic pictures.

BABAYEV, A.I.; BALATS, M.Ya.; KAFTANOV, V.S.; LANDSBERG, L.G.; LYUBIMOV, V.A.; OBUKHOV, Yu.V.

Further search of the $\mu^+ \rightarrow e^+ + e^-$ decay.
Zhur. eksp. i teor. fiz. 43 no.5:1984 N '62. (MIRA 15:12)
(Mesons—Decay)

L 25390-65 EWT(m) IJP(c)

ACCESSION NR: AP5002146 S/0120/64/000/006/0051/0052

AUTHOR: Lyubimov, V. A.; Pavlovskiy, F. A.

TITLE: Increasing the effective volume of a spark-discharge chamber having a large interelectrode gap

SOURCE: Pribory i tekhnika eksperimenta, no. 6, 1964, 51-52

TOPIC TAGS: spark discharge chamber

ABSTRACT: To reduce the fringe effects in a large-gap spark chamber and to make the height of the usable volume of the chamber practically equal to the magnet gap, a resistor was distributed around the entire chamber, between its electrodes; this resistor also acted as an output shunt to the impulse generator. This measure resulted in the entire volume of the chamber becoming equally effective and the particle tracks near the chamber walls were not distorted. Four photographs show the improved operation of 30--40-cm-gap chambers. Orig.

Card 1/2

L 25390-65

ACCESSION NR: AP5002146

art. has: 4 figures.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki GKAE (Institute of Theoretical and Experimental Physics, GKAE)

SUBMITTED: 28Nov63 ENCL: 00 SUB CODE: NP

NO REF SOV: 001 OTHER: 002

Card 2/2

LYUBIMOV, V.A.; PAVLOVSKIY, F.A.

Increase of the effective volume of a spark chamber with a large interelectrode gap. Prib. i tekh. eksp. 9 no.6:51-52 N-D '64. (MIRA 18.3)

1. Institut teoreticheskoy i eksperimental'noy fiziki Gosudarstvennogo komiteta po ispol'zovaniyu atomnoy energii SSSR.

ACCESSION NR: AP4025951 S/0056/64/046/003/1142/1146

AUTHOR: Lyubimov, V. A.; Pavlovskiy F. A.

TITLE: Measurement of ionizing ability of particles in a spark chamber

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 46, no. 3, 1964, 1142-1146

TOPIC TAGS: spark chamber, particle ionizing ability, inert gas chamber, effect of additive, sensitive chamber time, spark track inclination, track brightness

ABSTRACT: The sensitive time of a spark chamber with a large (30 cm) interelectrode spacing was investigated and was found to be large (tens of microseconds) when the chamber was filled with a pure inert gas, whereas a small additive of air, propane, or alcohol strongly reduces the sensitive time. The spark discharge was observed to have a structure consisting of characteristic bunches, with a staircase form for inclined tracks. The appearance of the discharge depends on the delay of the high voltage pulse, with the number of bunches decreasing with increase in delay or with increase of the amount of additive for constant delay time. Certain hypotheses to explain this structure were advanced and tested

Card 1/4

ACCESSION NR: AP4025951

directly by measuring the ionizing ability of particles in a spark chamber. It is shown that tracks of particles with different ionizing abilities continue to differ in brightness even when the track structure becomes too fine to discern the details. "The authors are grateful to Academician A. I. Alikhanov who suggested the work, to Yu. V. Galaktionov for a discussion of the results and for assistance in the measurements, and to F. A. Yech for assistance in the measurements. Orig. art. has: 4 figures.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki (Institute of Theoretical and Experimental Physics)

SUBMITTED: 11Dec63 DATE ACQ: 16Apr64 ENCL: 02

SUB CODE: PH, SD NR REF SOV: 000 OTHER: 001

Card 2/4

L 65207-65 EWT(m)/T/EWA(m)-2

ACCESSION NR: AP5021735 UR/0386/65/002/002/0090/0094

AUTHOR: Alikhanov, A. I.; Bayatyan, G. L.; Brakhman, E. V.; Galaktionov, Yu. V.; Yeliseyev, G. P.; Yech, F. A.; Zel'dovich, O. Ya.; Landsberg, L. G.; Lyubimov, V. A.; Sidorov, I. V.

TITLE: Elastic backward scattering of π-mesons by neutrons in the 1.4-4.0 Bev/s pulse range

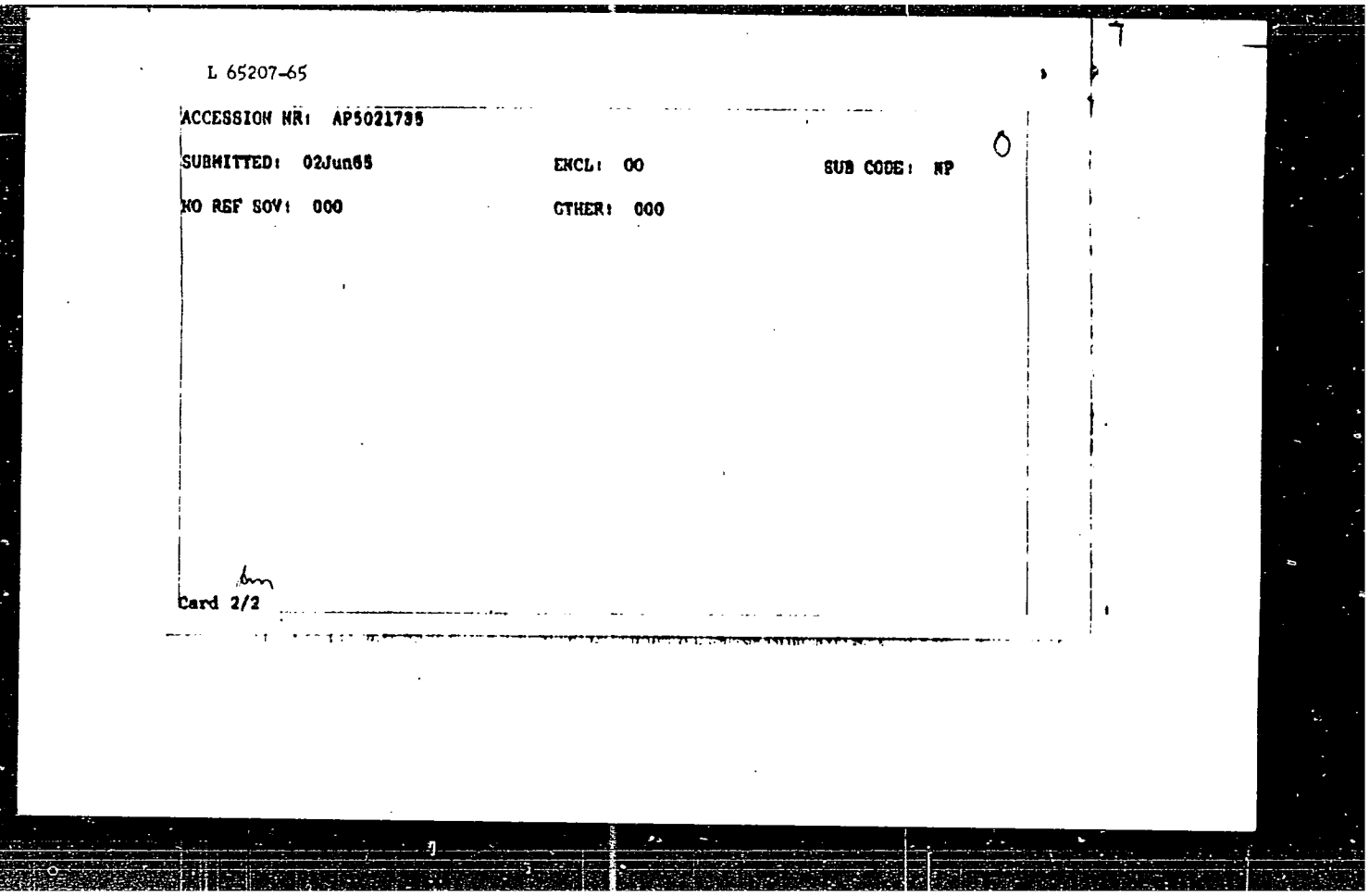
SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 2, 1965, 90-94

TOPIC TAGS: pi meson, particle scatter, neutron scattering

ABSTRACT: The elastic backward scattering reaction $\pi^- + n \to \pi^- + n$ is studied in the 1.38-4.05 Bev/s pulse range. 1700 events of this reaction were selected with a pion scattering angle of >90°. The solid angles for these events were measured (accuracy of measurement in the horizontal plane was 1° and in the vertical plane--5°). The results are given in graphic and tabular form. Orig. art. has: 3 figures, 1 table.

ASSOCIATION: none

Card 1/2



L 65207-65

ACCESSION NR: AP5021735

SUBMITTED: 02Jun65 ENCL: 00 SUB CODE: NP

NO REF SOV: 000 OTHER: 000

Card 2/2

L 14439-66 EWT(m)/T IJP(c)
ACC NR: AT6002501 SOURCE CODE: UR/3138/65/000/372/0001/0008

AUTHOR: Galaktionov, Yu. V.; Landsberg, L. G.; Lyubimov, V. A.

ORG: none

TITLE: Efficiency of scintillation counters in registration of neutrons with a momentum of several bev/c

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Institut teoreticheskoy i eksperimental'noy fiziki. Doklady, no. 372, 1965. Issledovaniye effektivnosti registratsii neytronov s impul'som neskol'ko Bev/c stsintillyatsionnymi schetchikami, 1-8

TOPIC TAGS: scintillation counter, neutron detector, pion scattering, neutron scattering

ABSTRACT: The authors studied the efficiency of scintillation counters for registration of neutrons. The neutrons were produced by pion-neutron scattering at angles of 120-180° from a target of heavy or ordinary water located within a cylindrical spark chamber. The counter signal produced by forward scattered neutrons was

Card 1/2

L 14439-66
ACC NR: AT6002501

4

recorded on an oscillograph while the chamber was simultaneously photographed. The efficiency of neutron registration was determined by using the photographs to sort out backward scattering events. Two types of scintillation counters were studied. In the first type, a block of scintillating plastic was used for registration of neutrons. The scintillator had a thickness of 280 mm on the path of the neutron. Neutrons were recorded at angles of ±12° from the axis of the counter. The efficiency of this type of counter was found to be 0.58±0.07 for a neutron momentum of 2.1 bev using data for a heavy water target. The second type of neutron recorder was made up of three thin (15 mm) scintillation counters with iron plates 6 cm thick in front of each of them. A separate photomultiplier was used for scanning each scintillation counter. This type of counter has an efficiency of 0.51 ± 0.06 for a neutron momentum of 3.0 bev/c. The authors are grateful to G. A. Bayatyan, O. Ya. Zel'dovich and N. N. Luzhetskiy for assistance with the measurements. We are also grateful to M. Ya. Balats for discussing a number of ideas in setting up the experiment. Orig. art. has: 1 figure, 3 tables.

SUB CODE: 18/ SUBM DATE: 21Jul65/ ORIG REF: 001/ OTH REF: 000

Card 2/2

L 30993-66 EWT(m)/T

ACC NR: AT6002498 SOURCE CODE: UR/3138/65/000/350/001/0012

AUTHOR: Alikhanov, A. I.; Bayatyan, G. L.; Brakhman, E. V.; Eliseev, G. P.; Galaktionov, Yu. V.; Landsberg, L. G.; Lyubimov, V. A.; Sidorov, L. V.; Zeldovich, O. Ya.; Yetch, F. A.

ORG: none

TITLE: π^- - meson-neutron elastic backward scattering at 1.4-4.0 bev/c

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Institut teoreticheskoy i eksperimental'noy fiziki. Doklady, no. 350, 1965. Pi sup minus-meson-neutron elastic backward scattering at 1.4-4.0 Bev/c, 1-12

TOPIC TAGS: pion scattering, neutron scattering, elastic scattering, scattering cross section, angular distribution, spark chamber

ABSTRACT: The authors study the elastic backward scattering reaction $\pi^- + n \to \pi^- + n$ in the 1.38-4.05 bev/c range. A spark chamber was used with photographic and neutron counter registration. The experimental installation was highly efficient in

Card 1/2

L 30993-66
ACC NR: AT6002498

recording γ-quantum from π^0-decays, and the admixture of inelastic events $\pi^- + n \to \pi^- + n + K\pi^{0+-}$ in the 1700 cases of the elastic backward scattering reactions which were selected for study was no more than 2%. The solid angles for these cases were measured and the absolute cross sections were determined. Tables are given showing the cross section $\bar{\sigma}_n = \bar{\sigma}_{D_2O} - \bar{\sigma}_{H_2O}$ and $R = \bar{\sigma}_{H_2O}/\bar{\sigma}_{D_2O}$ as functions of energy. The total error in calculation of these cross sections due to necessary corrections for pion-pion and pion-neutron scattering in the ambient medium, electronic efficiency, beam composition and the shielding effect of nucleons in the deuterium was 25%. Data for σ_n and $\langle\sigma_n\rangle$ as functions of energy show some irregularity in the 2-3 bev region which may be due to resonance. Measurements of angular distribution for pion-neutron scattering show a minimum in the 162-180° region. The momentum transfer function is used as a basis for calculating the width of this minimum. A comparison of the experimental data obtained in this paper with those in the literature shows that the cross section $d\sigma/d\Omega$ is approximately inversely proportional to energy when the momentum transfer is constant. Orig. art. has: 4 figures, 2 tables.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 000/ OTH REF: 009

Card 2/2

ACC NR: AP7009663 SOURCE CODE: UR/0386/67/005/004/0125/0128

AUTHOR: Lyubimov, V. A.

ORG: none

TITLE: Possibility of investigating the p-p interaction in the energy interval 30 - 700 Gev

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 5, no. 4, 1967, 125-128

TOPIC TAGS: proton interaction, elastic scattering, scattering cross section, cosmic ray particle, particle counter

ABSTRACT: The author considers the possibility of investigating elastic pp interaction at energies 30 - 700 Gev, using primary cosmic-ray protons. The idea of the experiment is based on the relation between the proton scattering angles with the primary proton momentum and the transferred 4-momentum. In the experimental setup proposed for this purpose (Fig. 1) the primary protons are provided by the cosmic rays and the target is H_2 or D_2. The system of spark and calorimentric counters and the coincidence circuits required to ensure that only events with two particles in the final state are recorded and to determine the pp scattering cross section are briefly described. It is expected that more than 100 000 elastic-scattering events will be observed in 10 or 20 days of exposure. The expected accuracy of the experiment is discussed. Orig. art. has: 2 figures.

Card 1/2

ACC NR: AP7009663

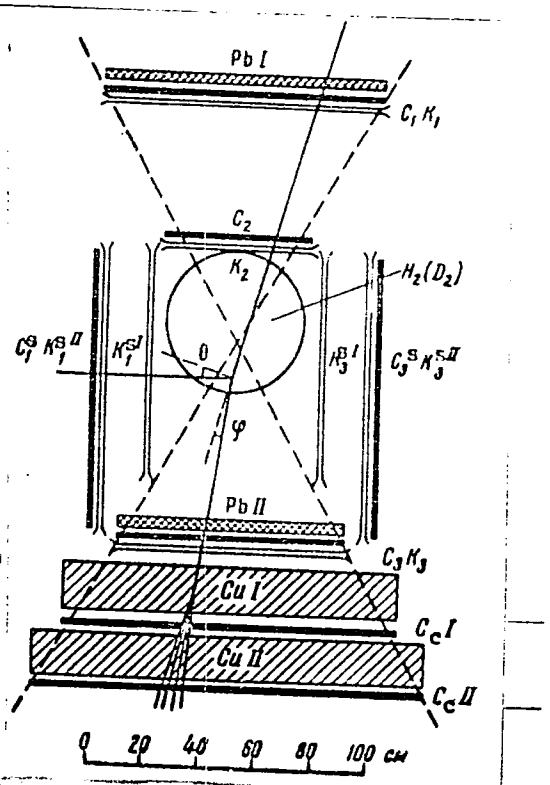


Fig. 1 Setup for the investigation of pp interaction: $C_{1,2,3}$ - scintillation counters of telescopes; $C^S_{1,2,3,4}$ - side scintillation counters; $C_{1,2}$ - scintillation counters of ionization calorimeter [2]; $K_{1,2,3}$ - filament spark chambers (filament spacing 1 mm) of telescope; $K^{SI}_{1,2,3,4}$ and $K^{SII}_{1,2,3,4}$ - side spark chambers; PbI and PbII - lead absorbers of 4 t-unit thickness each; CuI and CuII - copper absorbers of 170 g/cm^2 thickness each.

SUB CODE: 20/ SUBM DATE: 17Nov66/

ORIG REF: 002/ OTH REF: 002

Card 2/2

AKIMOV, T.S., kand.tekhn.nauk; [illegible], N.Yu., kand.tekhn.nauk;
LYUBIMOV, V.A., mladshiy nauchnyy sotrudnik

Increasing the size of weft packages in the weaving of woolen cloth. Nauch.-issl.trudy TsNIIShersti no.16:43-54 '61.
(MIRA 16:11)

LYUBIMOV, V.A., inzh.; Prinimali uchastiye: GULYAYEVA, R., laborant; YEVDOKIMOVA, V., laborant; KHRUSTALEV, P., rabotnik; ZHUKOV, V., rabotnik; CHUMAKOV, M., rabotnik

Automatic AT2-250-Sh loom for woolen fabrics. Nauch.-issl. trudy TSNIIShersti no.17:76-85 '62. (MIRA 17:12)

1. TSentral'nyy nauchno-issledovatel'skiy institut sherstyanoy promyshlennosti (for Gulyayeva, Yevdokimova). 2. Shuyskiy mashinostroitel'nyy zavod (for Chumakov).

ISTOMINA, T.I., inzh.; Prinimali uchastiye: LYUBIMOV, V.A., inzh.; PANFILOVA, Z.I., inzh.; YEVDOKIMOVA, V.P., starshiy laborant

Automatic UA-300-4Sh weft winder for the winding of wool yarn. Nauch.-issl. trudy TSNIIShersti no.17:86-91 '62.

(MIRA 17:12)

Lyubimov V. B.

89-3-7/30

AUTHORS: Bogachev, N. P., Van Shu-Fen', Gramenitskiy, I. M., Kirillova, L. F., Lebedev, R. M., Lyubimov, V. B., Markov, P. K., Merekov, Yu P., Podgoretskiy, M. I. Sidorov, V. M., Tolstov, K. D., Shafranova, M. G.

TITLE: The Interaction of 9 Bev Protons With Nuclei in Photo-Emulsion (Vzaimodeystviye protonov s energiyey 9 Bev s yadrami foto-emul'sii)

PERIODICAL: Atomnaya Energiya, 1958, Vol. 4, Nr 3, pp. 281 - 284 (USSR)

ABSTRACT: The photoemulsion НИКФИ-Р with a layer of about 450 μ was irradiated with protons within and out of the vacuum chamber of the 9 Bev synchrophasotron. The mean range of 9 Bev protons for an interaction is 34,7 $\pm$ 1,5 cm.(The scattering for angles below 5^{0} was not taken into account).
258 cases of a nuclear interaction were observed. The mean number of fast particles n_{g} generated in a process of interaction amounts to 3,4 $\pm$ 0,1. The angular distribution of these particles shows a clearly preferred forward motion. The mean number of black and grey traces $\overline{N}_{n}$ - the recoil nuclei

Card 1/2

The Interaction of 9 Bev Protons With Nuclei in Photo-Emulsion

not being considered - is 8,3 ± 0,5.
From 249 found stars 16 can be considered to constitute an interaction of the initial protons with "free" or "quasi-free" protons.
13 stars can be considered to represent an interaction between protons and "quasifree" neutrons. All of them have an odd number of traces, and in the point of formation of the star β-traces can be observed. The mean number of fast particles in these 13 star traces is 3,1 ± 0,3. There are 5 figures, 1 table, and 7 references, 1 of which is Slavic.

SUBMITTED: December 16, 1957

AVAILABLE: Library of Congress

1. Photoemulsions-Proton irradiation 2. Vacuum chambers-Applications
3. Particles-Distribution

Card 2/2

2'(7) SOV/56-35-2-56/66

AUTHORS: Gramenitskiy, I. M., Danysh, M Ya , Lyubimov V. B. Podgoretskiy, M I., Tuvdendorzh, D.

TITLE: Concerning the Problem of the Angular Correlation Between the Secondary Particles Which Are Generated in Nuclear Collisions of High Energy (K voprosu ob uglovoy korrelyatsii mezhdu vtorichnymi chastitsami, obrazuyushchimisya v yadernykh stolknoveniyakh vysokoy energii)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958 Vol 35, Nr 2(8), pp 552-553 (USSR)

ABSTRACT: The above-mentioned relativistic particles were generated by the interaction of protons (~ 9 BeV) with the nuclei of the photoemulsion. The authors measured the coefficient of the correlation between the number of the particles which fly away at different spatial angles. For the correlation coefficient $R = \overline{n_1 n_2} - \overline{n_1}\,\overline{n_2}$ the expression $R = p_1 p_2 (D_n - \bar{n})$ may be obtained n_1 and n_2 denote the numbers of the secondary relativistic particles in any separate star the emission directions of which are within the spatial angles Ω_1 and Ω_2.

Card 1/3

Concerning the Problem of the Angular Correlation Between the Secondary Particles Which Are Generated in Nuclear Collisions of High Energy

$\bar{n}$ denotes the average number of the particle in the star and D_n - the dispersion of the particle number. In order to measure the value of R, the authors used 450 nuclear spallations which were found by examination of an emulsion chamber consisting of emulsions NIKFI «R» with a density of 400 μ. This chamber was irradiated by the internal beam of the synchrophasotron of the Ob"yedinennyy institut yadernykh issledovaniy (United Institute of Nuclear Research). The investigation was carried out along the tracks made by the primary protons. For D_n and $\bar{n}$ the values $3,54 \pm 0,15$ and $5\ 23 \pm 0\ 09$ respectively, were found. Further investigations are based on the measurement of the quantity $Q = R \quad p_1 p_2 (D_n \quad \bar{n})$ for different values of the angles Ω_1 and Ω_2. The results of these measurements are given in a table. According to these results, there is no total statistical independence between the emission directions of the secondary particles - "narrow pairs" (uzkaya para) were found by the analysis of 375 spallations. The investigation of the correlations in the direc

Card 2/3

Concerning the Problem of the Angular Correlation Between the Secondary Particles Which Are Generated in Nuclear Collisions of High Energy

tions of emission of the secondary particles may be useful for the verification of the statistical theory of the multiple production of pairs. For this purpose, it is essential to investigate the elementary collisions of nucleons and pions with nucleons. Moreover, it is necessary to take into account the possible existence of angular correlations which are connected with the conservation laws. The authors thank E. V Yesin, T. V. Pokidov, L. I. Fedorov and M. I. Filippov for their participation in carrying out measurements and D. S Chernavskiy for his discussion of the results of this paper. There are 1 figure and 4 references, 2 of which are Soviet.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United Institute for Nuclear Research)

SUBMITTED: May 31, 1958

Card 3/3

LYUBIMOV, V.B.; MARKOV, P.K.; TSYGANOV, E.N.; CHZHEN PU-IN [Cheng P'u-ying]
SHAFRANOVA, M.G.

Elastic scattering of a proton on a proton at an energy of 8.5 BeV. Zhur.eksp.i teor.fiz. 37 no.4:910-916 O '59.
(MIRA 13:5)

1. Ob"yedinennyy institut yadernykh issledovaniy.
(Protons--Scattering)